

Initiatives to Prevent Environmental Pollution

Basic Approach

In addition to complying with relevant laws and regulations, the JXTG Group works to maintain and conserve natural resources such as water, soil, and the atmosphere by curbing the further release of environmental pollutants, effectively utilizing water resources, and other measures.

To prevent environmental pollution, we continuously work to mitigate risks by improving our facilities and conducting emergency response and other training drills covering items identified as serious concerns from an environmental perspective through the environmental management system of each company.

For information on our environmental management structure, see the Environmental Management section on pp. 28–29.

Initiatives to Reduce the Release of Air Pollutants

Reducing SOx Emissions

Sulfur oxides (SOx), which are known to cause acid rain, are released into the atmosphere mainly as a component of exhaust gases from combustion facilities.

The JXTG Group carries out measures such as using fuels with low sulfur content, removing SOx using flue gas desulfurizers, and managing emissions using voluntary standards. Thirteen thousand tons of SOx were emitted in fiscal 2017, a decrease of three thousand tons from the previous fiscal year. We will continue our efforts to reduce these emissions going forward.



Flue gas desulfurizer

Reducing NOx Emissions

Nitrogen oxides (NOx), which are also known to cause acid rain, are released into the atmosphere mainly as a component of exhaust gases from combustion facilities.

The JXTG Group carries out measures such as using low-NOx boilers at combustion facilities, removing NOx using flue gas denitrizers, and managing emissions using voluntary standards.

Fifteen thousand tons of NOx were emitted in fiscal 2017, which is about the same as the previous fiscal year.



Flue gas denitrizer

Reducing VOC Emissions

Volatile organic compounds (VOCs), which are thought to produce photochemical oxidants through a photochemical smog reaction with NOx and ultraviolet rays from sunlight, are released from places such as storage facilities for petroleum products.

The JXTG Group is installing VOC recovery equipment in storage facilities and truck loading facilities.

Sixteen thousand tons of VOCs were released in fiscal 2017, a decrease of two thousand tons from the previous fiscal year. The decrease can be attributed to a decline in the storage and handling volume of gasoline intermediates.

VOC Recovery

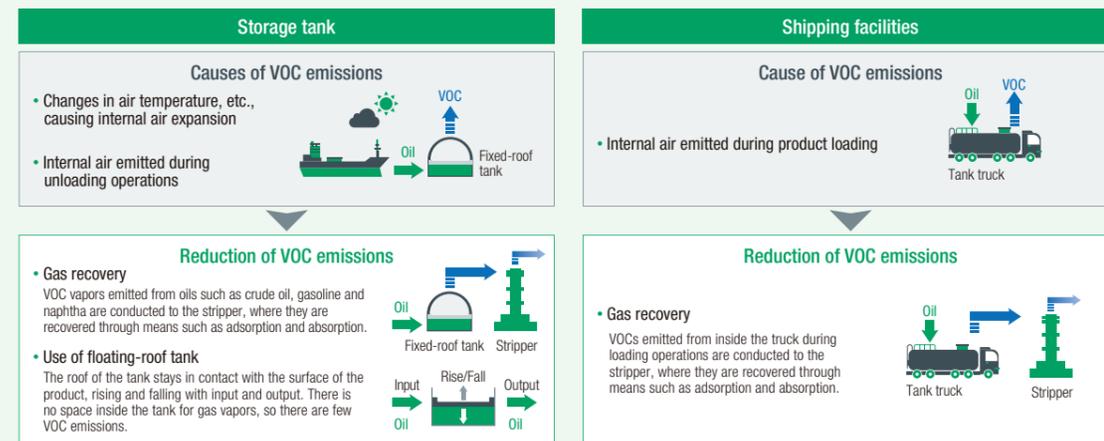
Volatile organic compounds (VOCs) containing hydrocarbons are released into the air whenever gasoline is pumped from a tank truck into a storage tank at a service station. These VOCs are not only a source of photochemical oxidants, but also cause irritating odors in neighboring communities and can adversely affect the health of both customers and employees.

Therefore, JXTG Nippon Oil & Energy has installed recovery equipment on the ventilation ducts of service station storage tanks, which enables tank trucks to recover these VOCs so that they are not released into the atmosphere.

The JXTG Nippon Oil & Energy Group's Kiire Terminal recovers, without releasing, the gases that have accumulated inside tankers when loading crude oil, and reuses the VOCs contained in these gases by absorbing them into the crude oil. Gases, including odor-causing ones, that are not absorbed are broken down.

The JXTG Group was the first in the world to implement this mechanism. This technology is contributing to the advancement of environmental conservation measures and the effective utilization of energy.

VOC Emissions and Reduction Measures at Refineries



Effective Utilization of Water Resources and Reducing the Release of Water Pollutants

Effective Utilization of Water Resources

The JXTG Group uses water for purposes such as operating and cooling power generation facilities at refineries and smelters. Approximately 90% of this water is seawater.

In fiscal 2017, the volume of water used was 1.85 billion tons, and the water discharge volume was 1.81 billion tons. The scope of data aggregation was expanded in fiscal 2017 due to the business integration.

For the effective use of water resources, the JXTG Group recycles approximately 97% of the water used for cooling at its refineries. In addition, to reduce the amount of water used, smelters that use seawater for cooling have partially switched to recycled water.

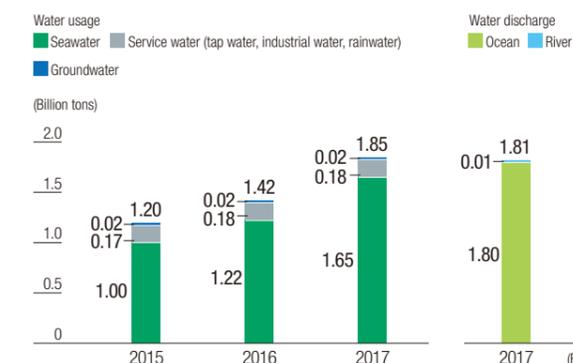
As part of our continuous efforts to ascertain the status of water resources, we use tools, such as water risk maps from the World Resource Institute, to verify whether the locations of our business sites in Japan and overseas are in areas of elevated water risk.

At the Caserones Copper Mine in Chile, where there

is a high risk of drought, approximately 80% of the water used in the production process is recycled. As an operating mine, it has the lowest level in Chile of water usage per ton of ore processed.

At each of its refineries and smelters, the Group has implemented environmental management systems, which are utilized to assess the environmental impact of water usage and respond accordingly.

JXTG Group Water Usage and Water Discharge



Note: For detailed data, see p. 79 of the Data section.

Reducing the Release of Water Pollutants

We manage and monitor pollutants in waste water through regular maintenance of water treatment facilities based on voluntary standards that are more rigorous than laws, regulations, ordinances, and agreements, including Japan's Water Pollution Prevention Act.

In addition to our efforts at refineries and smelters, we carry out continuous operations for the treatment of acid mine drainage at closed mines.

Preventing Marine Pollution

With regard to marine transport of oil, the JXTG Group is required to comply with the International Convention for the Prevention of Pollution from Ships (MARPOL), an international convention developed by the International Maritime Organization that includes regulations for the prevention of environmental pollution by oil and the prohibition of waste discharge into oceans and seas.

In addition to fully complying with this convention, we take further steps to prevent marine pollution, such as taking incinerator ash as defined in the convention back to land for proper disposal rather than discharging it into the ocean.

Management of Closed Mines

Of the 39 closed mines managed by JX Nippon Mining & Metals, acid mine drainage (AMD) treatment is an ongoing obligation at 12 mines pursuant to the Mine Safety Act. JX Nippon Mining Ecomanagement performs AMD treatment, manages tailings, and carries out other operations at these sites.

The main operations taking place in the management of closed mines include the treatment and detoxification of AMD, which is strongly acidic and contains heavy metals from ores remaining in the mines and tailings, as well as the maintenance and protection of tailings and mine shafts.

AMD is generated continuously after a mine is closed as a result of the chemical reaction of rainwater and other water with ores remaining in the mines and tailings in the dams. Therefore, the operation of treatment facilities must be maintained continuously.



Motoyama AMD treatment facility at Toyoha Mine



Gallery inspection at Hanawa Mine

Closed Mines Where AMD Treatment Is Carried Out

● Twelve closed mines where AMD treatment is carried out



Soil Contamination Countermeasures

The JXTG Group performs systematic surveys on all land that it owns that has the potential for soil or groundwater contamination, focusing particular efforts on our property where refineries, oil depots, service stations and other facilities are located. If pollution is detected, we implement appropriate countermeasures to address it.

In addition, NIPPO Corporation has been involved in the contamination purification business since before Japan's Soil Contamination Countermeasures Act took effect.

Soil Surveys and Countermeasures in Fiscal 2017

(Expenditure: millions of yen)

	Surveys		Countermeasures	
	Number of cases	Expenditure	Number of cases	Expenditure
Service stations	170	224	54	1,630
Oil depots	1	0.3	0	0
Refineries/Business sites	7	18	1	1,377
Total	178	243	55	3,007

Soil Contamination on Group Property Reported in Fiscal 2017

Category	Location	Survey results				Status
		Soil		Groundwater		
		Substance	Scale factor	Substance	Scale factor	
Idle land	Aichi	Benzene	5.8	Benzene	94.00	Countermeasures currently under implementation